

PATENT
Serial No: 10/684,518
Docket No: 10517-190

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) An electromagnetically driven valve device comprising:
a pair of electromagnets facing each other; and
an armature that reciprocates by being attracted to the pair of electromagnets so as to open and close a valve element,
wherein at least a first electromagnet of the pair of electromagnets is integrated with a retainer member that retains the first electromagnet so as to form an assembly; and
wherein the pair of electromagnets and the armature are mounted by co-fastening the assembly together with a second electromagnet of the pair of electromagnets or another assembly to a mounting surface provided for the electromagnetically driven valve device, and further comprising a co-fastening member that co-fastens the assembly and the second electromagnet or the another assembly to the mounting surface,
wherein the co-fastening member is disposed in a through-hole formed in the assembly so as to fix the assembly to the mounting surface, and
wherein the through-hole allows a fluid to be supplied to the assembly.
2. (Original) The electromagnetically driven valve device according to claim 1, wherein the retainer member is molded together with the electromagnet so as to have a predetermined shape and unitarily retain the electromagnet.
3. (Original) The electromagnetically driven valve device according to claim 1, further comprising:
an urging member that is provided on a face in the assembly which is remote from the mounting surface and that urges the armature in a direction of the mounting surface; and
a casing that is provided in the assembly and that houses the urging member,
wherein the casing is formed by pressing.

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4. (Original) The electromagnetically driven valve device according to claim 3, wherein the casing is formed using a material containing a magnetic substance.

5. (Original) The electromagnetically driven valve device according to claim 3, wherein the casing has such a shape as to form a gap that allows passage of a fluid between the casing and the assembly that is fastened together with the second electromagnet or the another assembly.

6. (Original) The electromagnetically driven valve device according to claim 3, wherein at least two armature-electromagnet sets each of which includes the pair of electromagnets and the armature movable in association with the pair of electromagnets are disposed adjacent to each other, and wherein at least two casings provided corresponding to the at least two armature-electromagnet sets are formed in such a fashion that the at least two casings are connected to each other.

7. (Original) The electromagnetically driven valve device according to claim 1, wherein each electromagnet has a planar shape having a relatively long dimension and a relatively short dimension, and wherein two pairs of electromagnets are provided, and the assemblies are formed with respect to each pair of electromagnets, and both assemblies are provided so as to attract the armature in the same direction, and wherein the two electromagnets integrated are disposed so that a relatively long side of one of the two electromagnets and a relatively long side of another one of the two electromagnets are adjacent to each other, and so that a predetermined opening angle is formed between lengthwise axes of the two electromagnets.

8. (Canceled)

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9. (Currently Amended) The electromagnetically driven valve device according to claim 8 1, further comprising:

a supporting portion that is provided in the assembly co-fastened with the second electromagnet or the another assembly and that supports the armature for the reciprocating movements; and

a fluid passageway in which the fluid passes

wherein the fluid passageway includes a first recess portion provided in a surface of the assembly which is opposite from a surface that is attached to the mounting surface, the first recess portion being provided in a portion of the surface that includes a portion near the supporting portion and that is adjacent to the electromagnet incorporated in the assembly.

10. (Original) The electromagnetically driven valve device according to claim 9, wherein the assembly is disposed so that a surface of the assembly which is opposite from the surface attached to the mounting surface is located upward.

11. (Currently Amended) The electromagnetically driven valve device according to claim 8 1, further comprising a spacer disposed near the through-hole in which the co-fastening member is disposed,

wherein the spacer is provided for adjusting a mounting height of the assembly fastened together with the second electromagnet or the another assembly, with respect to the mounting surface.

12. (Previously Presented) The electromagnetically driven valve device according to claim 1, further comprising a recess portion that forms the mounting surface and that substantially conforms to a shape of the second electromagnet or the another assembly fastened together with the assembly,

wherein the recess portion provides a predetermined clearance between a side wall of the recess portion and the second electromagnet or the another assembly fastened together with the assembly.

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13. (Original) The electromagnetically driven valve device according to claim 1, wherein each electromagnet of the pair of electromagnets is integrated with the retainer member that retains the electromagnet so as to form an assembly; and a first assembly of the two assemblies is fastened together with a second assembly of the two assemblies to the mounting surface for the electromagnetically driven valve device so as to mount the pair of electromagnets and the armature, and wherein a coil of each electromagnet is embedded in a corresponding assembly of the two assemblies so that a connecting terminal of the coil is exposed on a surface of the corresponding assembly.

14. (Original) The electromagnetically driven valve device according to claim 13, wherein the connecting terminals of the coils are disposed in a predetermined positional relationship in a surface of the first assembly and a surface of the second assembly which face in one direction.

15. (Original) The electromagnetically driven valve device according to claim 14, further comprising a guide member that guides attachment of a connector member for electrical connection of the connecting terminals of the coils, wherein the guide member is disposed on at least one of the surface of the first assembly and the surface of the second assembly which face in one direction.

16. (Original) The electromagnetically driven valve device according to claim 15, further comprising a fall-apart preventing mechanism that substantially prevents the guide member from falling apart, wherein the guide member is provided with the fall-apart preventing mechanism provided in an attachment portion that is engaged when the connector member is attached to the surface of the first assembly and the surface of the second assembly which face in one direction.

17. (Currently Amended) An electromagnetically driven valve device comprising: a pair of electromagnets facing each other; and

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an armature that reciprocates by being attracted to the pair of electromagnets so as to open and close a valve element,

wherein at least a first electromagnet of the pair of electromagnets is integrated with retention means for retaining the first electromagnet so as to form an assembly, and

wherein the pair of electromagnets and the armature are mounted by co-fastening the assembly together with a second electromagnet of the pair of electromagnets or another assembly to a mounting surface provided for the electromagnetically driven valve device

further comprising a co-fastening member that co-fastens the assembly and the second electromagnet or the another assembly to the mounting surface,

wherein the co-fastening member is disposed in a through-hole formed in the assembly so as to fix the assembly to the mounting surface, and

wherein the through-hole allows a fluid to be supplied to the assembly.

18. (Original) An electromagnetically driven valve device comprising:

a pair of electromagnets facing each other; and

an armature that reciprocates by being attracted to the pair of electromagnets so as to open and close a valve element,

wherein two sets each of which includes the pair of electromagnets and the armature are mounted adjacent to each other, and

wherein each set of the two sets mounted adjacent to each other has a planar shape in a mounted fashion, the planar shape having a relatively long dimension and a relatively short dimension, and the two sets are disposed so that a relatively long side of one of the two sets and a relatively long side of another one of the two sets are adjacent to each other, and so that a predetermined opening angle is formed between lengthwise axes of the two assemblies.

19. (Original) An electromagnetically driven valve device comprising:

a pair of electromagnets facing each other in a vertical positional relationship; and

an armature that reciprocates in vertical directions by being attracted to the pair of electromagnets so as to open and close a valve element,

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wherein an upper surface side of an upwardly disposed electromagnet of the pair of electromagnets disposed in the vertical positional relationship or an upper surface side of an assembly incorporating the upwardly disposed electromagnet and retainer member means for retaining the upwardly disposed electromagnet is provided with a reservoir portion capable of holding a fluid that flows on an upper surface of the upwardly disposed electromagnet or an upper surface of the assembly during a non-operation state of the armature.

20. (Original) The electromagnetically driven valve device according to claim 19, wherein the reservoir portion is a recess portion provided at the upper surface side of the upwardly disposed electromagnet or the upper surface side of the assembly incorporating the upwardly disposed electromagnet.

21. (Original) An electromagnetically driven valve device comprising:
a pair of electromagnets facing each other; and
an armature that reciprocates by being attracted to the pair of electromagnets so as to open and close a valve element,

wherein a mounting surface on which the electromagnetically driven valve device is mounted has a recess portion that contacts at least one electromagnet of the pair of electromagnets and that has a shape corresponding to a contact portion of the at least one electromagnet, and the at least one electromagnet that contacts the mounting surface is disposed with a predetermined clearance from a side wall of the recess portion.